

CLAIMS

What is claimed is:

1 1. In a method of transmitting data from a computer having a
2 system bus connected a CPU, a main memory and a bus mastering network
3 controller having a parallel side, a serial side that is also connected to a
4 physical link and a buffer memory having a fixed number of memory
5 locations connected between said parallel side and said serial side, the steps
6 comprising:

7 commencing copying of a first portion of said data from said
8 main memory to said buffer memory;

9 commencing copying of a second portion of said data from said
10 main memory to said buffer memory immediately upon completing
11 the copying of said first portion and as soon as there are available
12 memory locations in said buffer memory.

1 2. The method of claim 1 further including the step of:
2 commencing transmission of said first portion of said data over
3 said physical link after a first predetermined quantity of data has been
4 copied from said main memory to said buffer memory.

1 3. The method of claim wherein said step of commencing
2 transmission of said first portion of said data over said physical link occurs
3 only after a first predetermined quantity of data has been copied from said
4 main memory to said buffer memory.

1 4. The method of claim 3 wherein said portion of data is a frame.

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1 5. The method of claim 4 further including the step of
2 communicating an indication from said serial side to said parallel side that a
3 frame has been successfully transmitted over said physical link.

1 6. The method of claim 5 further including the step of allocating
2 memory locations in said buffer memory as being available for new frame
3 data copy ^{from} said main memory upon receipt by said parallel side of said
4 indication that a frame has been successfully transmitted over said physical
5 link.

1 7. The method of claim 6 further including the step of recording
2 statistics relating to the transmission of data over said physical link in
3 memory locations associated with said parallel side and accessible to said
4 CPU.

1 8. The method of claim 1 wherein said network is a LAN.

1 9. The method of claim 1 wherein said LAN is an Ethernet.

1 10. The method of claim 1 wherein said ~~wherein said buffer~~
2 memory is a FIFO memory.

1 11. The transmission portion of a bus mastering network
2 controller connected to a system bus of a computer as is a CPU and main
3 memory and intended for transmitting a data frame from said computer
4 having a system bus to which is connected a CPU a main memory over a
5 physical link of a network, said controller comprising:
6 a buffer memory;
7 a parallel side connected to said system bus and to said buffer,

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8 said parallel side being adapted to transfer said data frame from said main
9 memory to said buffer;

10 a serial side connected to a physical link and to said buffer
11 memory, said serial side being adapted to transmit said frame serially over
12 said physical link;

13 means for writing said data frames from said main memory to
14 said buffer memory; and

15 means for indicating to said CPU that each of said data frames
16 has been written to said buffer; and

17 statistics registers included in said parallel side and addressable
18 by said CPU and connected to said serial side, said statistics registers being
19 adapted to record transmit related statistics.

1 12. The system of claim 11 wherein said transmit related statistics
2 include a number related to the number of underrun conditions
3 experienced and a number related to the number of collisions experienced.

1 13. The system of claim 11 further characterized by means for
2 writing a second data frame immediately upon the receipt by said CPU of
3 said indication.

1 14. The system of claim 11 wherein said network is a LAN.

1 15. The system of claim 14 wherein said LAN is an Ethernet.

1 16. The system of claim 11 wherein said buffer has a storage
2 capacity of 3028 bytes.

1 17. The system of claim 11 wherein said serial side includes means
2 for indicating to said parallel side that a data frame has been successfully

3 transmitted over said physical link.

1 18. The system of claim 17 wherein said serial side includes means
2 for counting transmission statistics.

1 19. In a method of transmitting data frame from a computer
2 having a system bus to which is connected a CPU running a network
3 operating system with an upper protocol layer, a lower protocol layer and a
4 driver layer, a main memory connected to said system bus and a bus
5 mastering network controller connected to said system bus and having a
6 parallel side, said serial side also connected to a physical link and a buffer
7 memory connected between said parallel side and said serial side, the steps
8 comprising:

9 in the parallel side:

- 10 a. receiving a command from said CPU;
- 11 b. acquiring said system bus
- 12 c. determining if said buffer is full;
- 13 d. if no, repeating step c;
- 14 e. if yes, commencing writing a frame from said
- 15 main memory to said buffer memory;
- 16 f. determining if all of said frame has read from said
- 17 main memory;
- 18 g. if no, repeating steps c through f;
- 19 h. if yes, indicating to said driver layer that said data
- 20 frame has been successfully transmitted;
- 21 i. determining if there are additional data frames in
- 22 main memory to be transmitted;
- 23 j. if yes, repeat steps b through i;

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- k. if no, enter idle state;
in the serial side:
a. determine if a threshold quantity of data has been
written to said buffer memory;
b. if no, repeat step a;
c. if yes, commence transmission of said data frame
over said physical layer;
d. determine if said data frame has been transmitted;
e. if no, repeat step d;
f. if yes, indicate transmission complete to said
parallel side and wait for next data frame written
to said buffer memory.

1 20. The method of claim 19 further characterized by the step of
2 allocating memory locations located in said buffer and occupied by said
3 frame being transmitted by said serial side over said physical link to be
4 reallocated for copying the next frame of data from main memory upon
5 receipt by said parallel side of said indication of transmission complete from
6 said serial side.

1 21. The method of claim 19 further characterized by the step of
2 recording transmission statistics after successful transmission of said data
3 frame;

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